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# STUDY TO VALIDATE THE NON-INTERFERENCE PERFORMANCE ASSESSMENT (NIPA) TECHNIQUE

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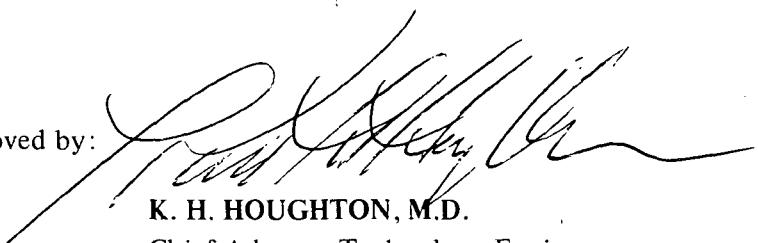
## Final Report

# STUDY TO VALIDATE THE NON-INTERFERENCE PERFORMANCE ASSESSMENT (NIPA) TECHNIQUE

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**FOREWORD**

This study was conducted for the purpose of validating a Non-Interference Performance Assessment (NIPA) technique previously developed by McDonnell Douglas Astronautics Company. The technique was tested for feasibility during the 90-Day Test of a Regenerative Life Support System in 1970. The results of this study indicate that trained observers using the technique can in fact provide quantitative, remotely obtained, ongoing data on morale levels of small groups.

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ACKNOWLEDGMENT

The cooperation and contributions of the personnel and management of the Walt Disney Studios to the study program are gratefully acknowledged.

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**CONTENTS**

Section 1	SUMMARY	1
Section 2	INTRODUCTION AND BACKGROUND	3
	2. 1    Definition and Measurement of Morale	3
	2. 2    NIPA Background	5
	2. 3    Study Objectives	8
Section 3	METHOD	11
	3. 1    Selection of Source Material	11
	3. 2    Criterion Development	13
	3. 3    Equipment and Facilities	14
	3. 4    Selection and Training of Observers	15
	3. 5    Experimental Design	16
Section 4	RESULTS	21
	4. 1    Criterion Measure	21
	4. 2    Observer Training	26
	4. 3    Experimental Sessions	29
Section 5	TECHNIQUES FOR DISPLAY OF NIPA DATA	35
	5. 1    User Needs	35
	5. 2    Display Techniques	36
	5. 3    Methodological Considerations	37
Section 6	CONCLUSIONS	39
Section 7	REFERENCES	43
	APPENDIXES A THROUGH G	45

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**FIGURES**

1	NIPA Results	6
2	Experimental Design	17
3	"Ten Who Dared" Morale Judgments	22
4	Morale-Actualization Group No. 3	24
5	Morale-Actualization Group No. 6	25
6	Observer Training-Retest	27
7	Observer Training-Run 2	28

**TABLES**

1	Analysis of Variance Summary	30
2	Correlation Summary	32

## Section I SUMMARY

This study, under sponsorship of the NASA Manned Spacecraft Center, Houston, Texas, was conducted for the purpose of validating a performance assessment technique previously developed by McDonnell Douglas Astronautics Company and tested for feasibility in 1970 during the 90-Day Test of a Regenerative Life Support System. The NIPA (Non-Interference Performance Assessment) technique involves direct observation of group verbal activities by trained observers who rate the emotional content (affect) of each verbal interaction as either positive, negative, or neutral.

During the above-mentioned test, in which four men were confined for 90 consecutive days, feasibility of the NIPA technique was demonstrated and observer reliability was verified. However, the validity of the test was not proved because an independent criterion measure of morale for the confined crew was lacking. There were indications, however, that NIPA measures were tracking changes in crew morale. At approximately the two-thirds point (Days 60 to 70), morale apparently fell dramatically for a period of about ten days, and simultaneously NIPA measure of positive verbalization decreased in number. A need was indicated for a separate study to apply the NIPA technique under experimental conditions and using a clearly defined criterion measure against which the ability of NIPA observations to truly measure morale changes could be determined.

In the present study, motion picture film material of two quite different types of group activities was selected as source data. A criterion measure of group morale changes as the action progressed was obtained using a panel of judges. A group of eight college graduate students was then trained to use the NIPA observational technique. Under controlled experimental conditions they viewed the motion picture films and recorded their evaluations of

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## Section 2

### INTRODUCTION AND BACKGROUND

Development of technology for measuring crew performance during extended space missions is one of the important objectives within the manned space program. It is highly important that ground-based monitors of manned space missions be continuously aware of how the crew is doing in terms of (1) performance of mission tasks, (2) subjective reaction to the mission and mission conditions, (3) psychological health, (4) crew structure and process, and (5) group morale.

The NIPA technique, originally developed as a device for assessing crew performance in general, was found in previous studies to apparently have a strong potential for measurement of crew morale. The present study was designed to investigate the validity of the technique for such measurement.

#### 2.1 DEFINITION AND MEASUREMENT OF MORALE

The identification of morale state in spaceflight crews, as in other working groups, is important because, although it may not be positively correlated with good or poor work performance in real time, it is probably predictive of improved or degraded work performance at some time in the future.

A review of the literature on morale reveals a diversity of definitions, some of which are individual-oriented and others group-oriented. The following five definitions are representative of those found in the literature:

1. A condition of physical and emotional well-being in the individual that makes it possible for him to work and live hopefully and effectively, feeling that he shares the basic purposes of the group of which he is a member; and that makes it possible to perform his tasks with energy, enthusiasm, and self-discipline, sustained by a conviction that, in spite of obstacles and conflict, his personal and social ideals are worth pursuing.

2. The condition of a group where there are clear and fixed group goals (purposes) that are felt to be important and integrated with individual goals; where there is confidence in the attainment of these goals, and subordinately, confidence in the means of attainment, in the leaders, associates, and finally in oneself; where group actions are integrated and cooperative; and where aggression and hostility are expressed against the forces frustrating the group rather than toward other individuals within the group.
3. Morale is an attitude of satisfaction with the group, desire to continue in the group, and willingness to strive for the goals of the group.
4. Morale pertains to all factors in the individual's life that bring about a hopeful and energetic participation on his part so that his efforts enhance the effectiveness of the group in accomplishing the task in hand.
5. Morale is akin to the common notion of team spirit. It is a feeling shared by the group.

To have a basis for developing a criterion measure of morale and thus for assessing the validity of the NIPA technique, the essential ingredients of the above five definitions were distilled into the following definition, which was used as the baseline definition of morale for this study:

Morale is a characteristic of groups which reflects the extent to which members (1) accept and have confidence in the goals and purposes of the group, (2) are active and cooperative in striving to accomplish those goals and purposes, (3) are satisfied with group leaders and other group members, and (4) express hostility against outside forces rather than against group members.

Reports of objective, real-time measurement of morale states are practically nonexistent in the literature. Most reported research on morale is found in the industrial or military psychology fields. Where techniques of morale measurement are reported, they involve either paper and pencil attitude scales or indirect indices of morale by measurement of work production.

## 2.2 NIPA BACKGROUND

The Non-Interference Performance Assessment (NIPA) technique derives from Bales' technique reported in 1953 for the measurement of interactions among small group members (Reference 1). Bales' technique is oriented toward an understanding of the processes involved in group development and activity. For manned spaceflight programs, it offers an opportunity to measure from a remote location, provided communications between the operational mission site and the observational site are adequate, the character of group interactions without interfering with the ongoing activities of the group. Ultimately, it is desirable to relate any measure of crew performance or behavior to mission performance characteristics. The NIPA technique lends itself to this insofar as it is a measure of a variable which is thought to be incorporated in the gross parameter called morale. The relationship specifically stated would be that as psychosocial integrity of group processes deteriorates with time, aboard long-duration manned missions, so also would adherence to timelines and task accomplishments.

Non-Interference Performance Assessment (NIPA) was undertaken in 1970 during the 90-Day Manned Test of an Operational Regenerative Life Support System (References 2, 3, and 4) in an effort to determine the feasibility of remote measuring of psychological and social integrity of crew members. NIPA observers during the 90-Day Test viewed onboard crew behavior through a system of audio-video monitoring equipment. Observations on positive, negative, and neutral verbalization frequency, plus various other psychosocial parameters, were made during the period of time each day when all four crew members were free to interact.

Post-test analysis of the NIPA observations revealed that, while total interactions showed no significant diminution and negative interactions remained at approximately a constant level, there was a dramatic decrease in positive verbalizations (positive affect) during the 10-day period beginning at approximately Day 60 (Figure 1). Subjective impressions by program management suggested that this period was characterized by low morale on the part of onboard crew members. It is tempting to say, therefore, that NIPA observations of positive verbalizations can track a morale decrease. However,

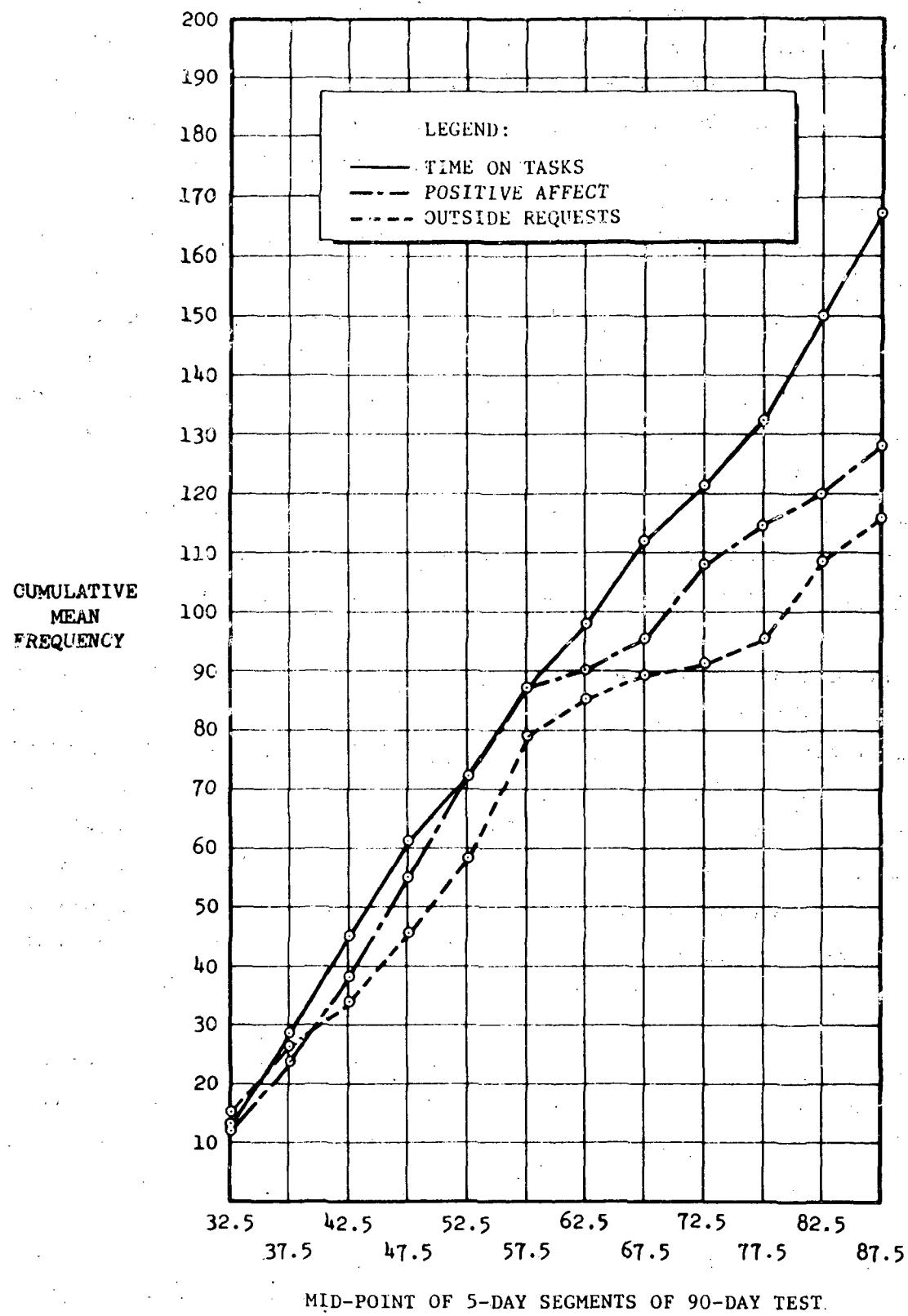


Figure 1. NIPA Results

such a statement is unjustified in view of the fact that there was no reliable measure of morale available during the test. Morale data derived solely from subjective comments of program management. Even though it was agreed by crew members post-test that morale appeared to be flagging at the same time that it was noted by program management, this does not serve as conclusive evidence that morale in fact changed. Although all tasks were accomplished by every crew member throughout the 90-Day period, one task was delayed for a period of approximately 18 hours during this 10-day period of apparent morale deterioration. In addition, another crew member, who had assiduously made entries in his personal log book each night prior to retiring, neglected to make any entries during the 10-day period of morale decline.

It is an interesting feature of such performance changes that the crew members themselves seemed to be unaware of the extent of the deterioration of their behavior and their performance. It is only in retrospect, and upon questioning during debriefings, that insight occurs. Characteristically, crew members deny any morale decline or any performance degradation accompanying such decline. Upon questioning and serious reflection, and upon being provided with information relative to the presumed morale decline, they tend to corroborate its existence. Mild amazement and surprise often accompany the discovery. While this is true for the majority of crew members, it is not true for all. A mechanism of denial appeared to be operative in one of the crew members and, regardless of the evidence presented, he appeared unable to accept the existence of the period of morale degradation or the deterioration in interpersonal relations associated with it.

A group sensitivity session, instituted at Day 69 by the onboard crew commander, revealed that crew members were relatively unaware of hostilities and tensions that had developed. Initial denial gave way to surprise as the hostilities were vented in a socially acceptable manner.

It is further interesting to note that there was withdrawal of all crew members and a decline in all interactions subsequent to the sensitivity session. Post-test reports indicated that the interactional decline was accompanied by eye

avoidance for a 24-hour period following the sensitivity session. Although positive verbalizations increased in frequency after the sensitivity session, their frequency failed to reach the rate characteristic of the period prior to the morale decline.

Positive verbalizations and total verbalizations for the crew of four during the 90-Day Test appeared independent of work performance. Throughout the confinement period, however, there was a noticeable absence of negative verbalizations. This is thought to be the result of a conscious effort by onboard crew members to suppress hostile reactions to ensure successful completion of the mission. Another factor of suppression may have been the presence of the NIPA observers, a fact known to the onboard crew members throughout the test. This "Big Brother" effect may have tended to suppress negative verbalizations of all sorts and may have been a factor contributing ultimately to the morale decline. Such observational systems, therefore, contain an implicit hazard in that they may contribute to decline in psychosocial integrity of operational groups by promoting suppression of negative affect.

### 2.3 STUDY OBJECTIVES

The major objective of the present study was to test the validity of the NIPA technique for measuring changes in group morale. Additional objectives were addressed to determining the most cost-effective ways of using the NIPA technique under operational conditions, e.g., using audio data alone versus audio-visual, using one observer versus multiple observers, assigning individual observers to observing one member of the group under evaluation versus observing all members. To attain these objectives, the following hypotheses were identified to be tested:

1. There is a positive relationship between positive verbal behavior and high morale.
2. There is a positive relationship between negative verbal behavior and low morale.
3. The observation of group behavior is unaffected by observational condition (audio-visual observation versus audio observation only).

4. There is no difference between observers observing the entire group under NIPA conditions and those observing individual members of the group only.

The latter two hypotheses were included to provide data on the operational feasibility of the NIPA technique for ground control use. If it developed that audio-visual conditions of observation are clearly superior to those of audio only, this could impact the ultimate operational utilization of the NIPA technique for long-duration missions since constant televised monitoring of crew members during long-duration missions would then be required. Furthermore, if man-on-man observation is clearly superior to man-on-group observation, the number of observers required would be a direct function of the number of crew members aboard and would impose additional and perhaps prohibitive ground personnel requirements.

**Section 3  
METHOD**

This section describes the selection of source material, development of a criterion measure, selection and training of observers, development and implementation of the experimental design, and the equipment and facilities used in the validation testing.

**3.1 SELECTION OF SOURCE MATERIAL**

Since motion picture film had been selected as the medium for presenting visual and auditory stimuli to the NIPA observers, the first phase of the study was addressed to identifying, evaluating, and acquiring motion picture film that would satisfy the following criteria:

1. Films should depict sequential relations of a group (4 to 6 adults, preferably in the 20 to 40 age group) over a period of time (at least several weeks, preferably longer).
2. Film must depict changes in social relations over time (deterioration, enhancement, change in nature) or changes in performance.
3. Film should be 16mm sound, with minimum duration of 1 hour.
4. Film must be rich in verbal interaction (heavily auditory versus visual).
5. Voices must be discriminable without reference to the visual.

The following organizations were contacted in a search for available film material that would meet the criteria:

American Broadcasting Company  
Cahill Associates  
California State University at Long Beach  
Columbia Broadcasting System  
Columbia Pictures  
Indiana University

Metro Goldwyn Mayer  
Modern Talking Picture Service  
Moody Institute of Science  
National Broadcasting Company  
Office of Naval Research  
Pennsylvania State University  
Psychological Films, Inc.  
United Artists  
University of Texas  
U. S. Army Audio-Video Exchange  
Walt Disney Studios  
Warner Brothers  
Wolper Productions

As a result of the above survey, a number of candidate films were screened either on loan to MDAC or at the respective studios. These included the following films and tapes:

The Ultimate Adventure - Moody Institute of Science  
Ten Who Dared - Walt Disney Studios  
The Actualization Group - Psychological Films, Inc.  
Drug Abuse, One Town's Answer - Cahill Associates  
Tektite Video Tapes - University of Texas  
Twelve Angry Men - United Artists  
Miracle of the White Stallions - Walt Disney Studios  
Mosby's Marauders - Walt Disney Studios  
Those Calloways - Walt Disney Studios

Evaluation of these films revealed that none of them completely satisfied the selection criteria that had been established. Since they were, however, fairly representative of the broad range of film material that might be available, it did not appear that further investigation would produce film material that would be more generally acceptable. Therefore, two candidate films

that most closely approximated the criteria were selected. These were "Ten Who Dared" and "The Actualization Group", both of which are described below:

1. "Ten Who Dared"

This is a commercial film produced by Walt Disney Studios in Burbank, California. The film provides a dramatic portrayal of the first known exploration of the full length of the Colorado River during the latter part of the 19th century. The film is replete with sound track and narrative support. Photography is in full color. Total running time of the 16mm film is approximately 90 minutes on three reels. The film was supplied by Walt Disney Studios at no charge for the duration of the study.

2. "The Actualization Group"

This 16mm black and white sound film was made in 1970 by Psychological Films, Inc., as a television presentation for the National Educational Television System. It portrays the interactions of a group of from 8 to 10 individuals (including two therapists) over a course of seven sensitivity training, or actualization group, encounters. Three of the 45-minute segments (Actualization Group Films 3, 6, and 7) were selected for use in the study.

### 3.2 CRITERION DEVELOPMENT

To test the validity of the NIPA technique for measuring level of morale in the groups portrayed in the motion picture source data, it is necessary to have an independent measure (criterion) of the morale state as it changes over time. It was decided to use a panel of judges who would view the motion picture material in its entirety and judge the level of group morale at pre-determined intervals. Judges were selected from management personnel within McDonnell Douglas Astronautics Company who were actively or had previously been in a supervisory capacity and who had been required to evaluate morale status of employees. Ten judges were selected to serve as sources of criterion information. Of these ten, four were currently at the Chief Engineer level or above and the others were members of the Biotechnology and Power Department. Two of the judges were female. Age range of the judges was approximately 53 at the high point and 35 at the low.

In an attempt to provide an indication of the morale state existing for each minute of film material, judges were exposed to all films once. Ten judges were exposed to Actualization Group Films Nos. 3 and 6, while 8 judges viewed "Ten Who Dared". All films were shown uncut including total narration and credits. This was thought to replicate conditions in which operational personnel, e.g., CAPCOM, would be required to judge the morale states of operational crews.

Judges were provided with rating forms as shown in Appendix A, which provided entry places for their rating of morale states on a scale from 1 through 5. Judges were additionally provided with a definition of morale for the purposes of this study (see Appendix B).

The rating form also provided space for judges to make an entry regarding the certainty of their rating within any one segment of the film. This provided an indication of level of confidence on the part of the judges in the rating given for that moment. Judges were required to make a rating and indicate their degree of certainty for that rating for each minute of the film material. Films were shown with no interruption and no deletions. All judges observed and listened to the films simultaneously. Discussions or comments on the part of the judges during the film presentation were discouraged.

Standardized written instructions were read to the judges prior to the first film presentation (Appendix C). Morale judgments were made approximately two weeks before NIPA observers arrived on the scene. At no time were judges ever in contact with observers. No training was given the judges beyond the instructions provided. Lighting levels during the judging sessions were maintained at approximately the same illumination level as for the experimental sessions.

### 3.3 EQUIPMENT AND FACILITIES

Films were projected from a distance of approximately 40 feet providing a projected image of approximately 10 x 12 feet. All film projections were made in a large conference room whose dimensions were 45 x 30 feet. Features of this conference room which added to its desirability for this

study included rheostatically controlled illumination, which permitted dimming of all lights within the room but not complete elimination of the illumination necessary for recording observations, and continued availability throughout the duration of the study. Thus, standardized environmental conditions prevailed throughout all observational and training sessions.

Projection equipment was a Bell and Howell Model 1552 16mm sound projector featuring solid-state audio circuitry, a 500W projection lamp, and fixed-focus zoom lens. A rotational timer preset to provide an audible signal at one-minute intervals was used to alert judges at morale judgment points and to give observers a reference point for recording their observations. Observers were instructed to put a check mark or other notation on their data sheets at the point in time when the audio tone was heard.

Standardized data recording forms were provided for both the judges and the observers. Appendix A shows the form developed and used by the judges to score morale levels occurring throughout the film presentations. Appendix E provides the standard format employed by all observers to make their recordings of verbal interaction. The one-minute timer and standardized film start points permitted synchronization of the recordings of both groups.

### 3.4 SELECTION AND TRAINING OF OBSERVERS

The observers who were to be trained to use the NIPA technique in the experimental portion of the validation study were selected through interviews with graduate students within the Southern California/Orange County area. Criteria for their selection included advanced degrees or current enrollment in graduate school within the fields of clinical psychology, social work, or sociology. Eight observers were selected after interviews with approximately 30 volunteers. Age range was from 22 through 43. Seven of the observers were females. Of the group of eight, four had completed requirements for a Master's Degree in their fields, and the other four were engaged in final completion work toward their Master's degrees. Two of the eight held State of California teaching credentials and had previous experience in teaching

elementary schools in various parts of the country. Only one of the eight had extensive clinical observational or therapeutic experience within the field of psychology.

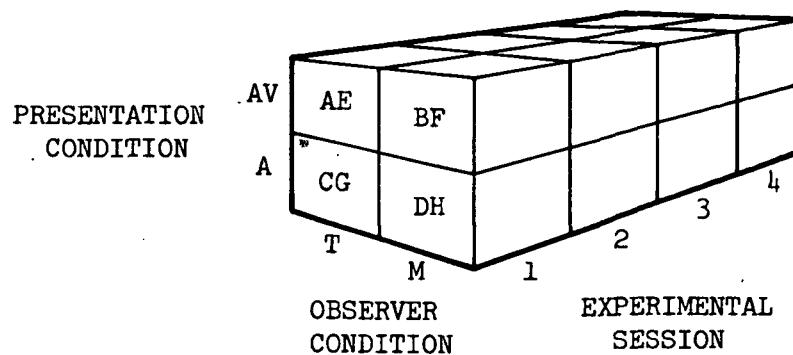
Training of observers was designed to provide an orientation to the study, background information on the NIPA technique, familiarization with the type of film presentation to be used, and practice in observing and recording NIPA parameters. All training was conducted in 4-hour sessions during the morning of each day of the 1-week training period. Motion picture material presented during training was taken from portions of "Ten Who Dared" and "The Actualization Group" that were not to be used in the experimental sessions.

Training progressed from brief presentation of materials to be observed to more lengthy presentations of similar or the same material. After each presentation and scoring of the NIPA observations, discussions were encouraged among observers to resolve major differences that might have occurred in scoring the previous material and to provide a source of confidence to the observers that the task at hand was accomplishable. The latter was attained through feedback immediately after the presentation of each film material. All training sessions took place in the conference room devoted to the observational sessions.

After each presentation of training film material, scores were tallied for each observer, and sums were obtained for each minute of observation from all observers. These were plotted on a blackboard in front of the group, and subsequent plots showed similarities or differences in group performance. When group performances appeared significantly different, attempts were made to determine the source of the variance within the observational group, and discussion ensued at that point on the reasons for the disparity in opinion and how to resolve the differences in the future.

### 3.5 EXPERIMENTAL DESIGN

The overall experimental design, shown in Figure 2, provides for randomized presentation of the film material among the eight observers. Each observer was exposed to all film material available during each experimental session.



## EXPERIMENTAL SESSION

SUBJECT	1	2	3	4
A	AV-T	A-M	A-T	AV-M
B	AV-M	AV-T	A-M	A-T
C	A-T	AV-M	AV-T	A-M
D	A-M	A-T	AV-M	AV-T
E	AV-T	A-M	A-T	AV-M
F	AV-M	AV-T	A-M	A-T
G	A-T	AV-M	AV-T	A-M
H	A-M	A-T	AV-M	AV-T
SUBJECT	1	2	3	4

## EXPERIMENTAL SESSION

## LEGEND:

AV = AUDIO VISUAL

A = AUDIO ONLY

M = MAN ON MAN

T = MAN ON GROUP

Figure 2. Experimental Design

The sequence of presentation was adjusted from session to session to preclude biasing of results. While Actualization Group Film No. 3 was shown first during Session 1, during Session 2 the same film was the second film in sequence. Film material for "Ten Who Dared" was split into that available from Reel No. 1 and that available from Reel No. 2 and was shown as two separate films. Thus, four film sequences were available for observation by the NIPA observers during each experimental session.

All material presented during the experimental sessions was edited by the film operator using cues previously placed on the film, or through use of timing cues derived from previous film analyses. Editing served to exclude narrative, explanatory, and/or unnecessary scenic presentations. Thus, observations during the experimental sessions were devoid of most cues available previously to the judges. All that remained for the NIPA observers were sequences of films in which interactions were taking place among various group members. This was done to eliminate from the NIPA presentations as much "operational" information as possible that could assist in making decisions on emotional content. This is considered analogous to the situation in which non-operational personnel would be required to make the same kinds of observations during an operational mission. In essence, operational information on the mission was not available to the NIPA observers.

A standardized set of observer instructions (Appendix D) was presented before the first experimental session. Observers were provided with pencils and data sheets (Appendix E) and were assigned to observational conditions.

Observational conditions were dictated by the experimental design as shown in Figure 2. These were:

1. AV-T, or observation of audio-visual material while being required to record responses of the total group.
2. A-T, or presentation of audio material only while being required to record responses of the total group.
3. AV-M, or presentation of audio-visual material while being required to record responses of one member of the group.
4. A-M, or presentation of audio material only while being required to record responses of one member of the group.

Test sessions occurred over a 4-day period following training. A 1-week delay was instituted between the end of training and the beginning of observational sessions because time cues had to be provided on the film material for the projector operator's use during observational sessions. All film was provided with time cue information, which was utilized throughout the presentations.

Prior to the initiation of observational sessions, a training refresher was administered on the first day of the week of the observational sessions. The refresher consisted of a repeat performance of films previously employed during the training sessions. In addition, all observers were requested to write independently their definition of positive, neutral, and negative verbalizations, ostensibly as an indication of their degree of understanding of the requirements for subsequent experimental observations. At the conclusion of the experimental sessions, observers were again required to provide a written indication of their understanding of positive, neutral, and negative verbalizations, and it was then revealed that the purpose for this exercise had been to determine the extent, if any, of a calibration shift on the part of the observers during the experimental sessions. Observer definitions from pre- and post-experimental periods are provided in Appendix F.

Section 4  
RESULTS

Results will be discussed in three subsections. The first subsection deals with criterion sessions using the judges, the second presents the results of the observer training sessions for the experimental observers, and the third deals with NIPA data obtained during the experimental sessions and its relationship to the criterion measure of morale.

4.1 CRITERION MEASURE

Data for each film, as obtained from the judges during the criterion sessions, is presented in Figures 3, 4, and 5. Figure 3 presents morale scores of the eight judges who observed the film "Ten Who Dared". Raw data is provided in Appendix G. Data are plotted at the upper portion of this figure as a transform. The transform was obtained by eliminating all scores of neutral (a score of 3 on the data sheet), summing all positive scores for each minute, summing all negative scores for each minute, and subtracting negative from positive scores. Positive scores were considered to be a rating of 4 or 5, negative scores were considered to be a rating of 1 or 2.

This transform results in a graph that travels through a conceptual zero point. The zero point should not, however, be construed as the point of neutral morale but simply as an excursion position for a score moving from high morale to low morale, or vice versa.

Examination of Figure 3 reveals a systematically varying relocation of the morale score from a maximum of +8 to a minimum of -8 over time. Some prominent low-morale points on Reel 1 are seen at 13, 18, 20 to 23, and 30 minutes. High morale is seen at 10, 16, 25 to 27, and 31 minutes into Reel 1. Reel 1 apparently was scored as having as much high morale as low morale by the eight judges. Reel 2 shows predominantly low morale except for the 48-minute elapsed-time mark, where a high morale peak occurs. Reel 3

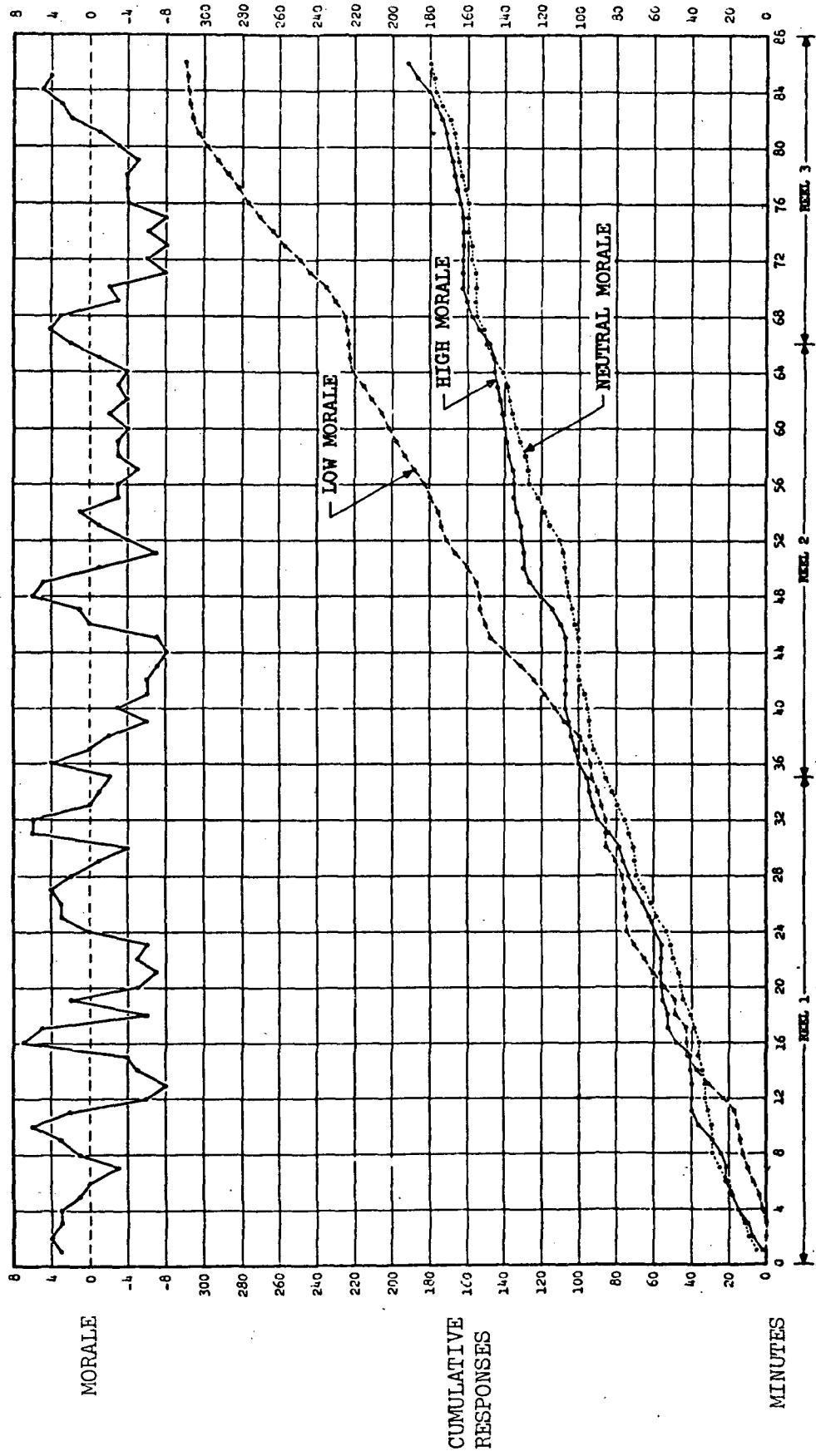


Figure 3. "Ten Who Dared" Morale Judgments

shows an initial high morale point seen at 67 minutes into the film, and then a long period of low morale. A reversal toward high morale begins to occur at 79 minutes into the film. The reversal persists through the end of the film and provides some support for the notion of a typical "Hollywood ending".

The lower portion of this figure shows all scores obtained from the judges for the same film cumulatively plotted, but separately, for low, high, and neutral morale. All cumulative curves should be examined from both the standpoints of absolute numbers as well as rates of increase (slopes).

Examination of these curves reveals that low morale predominated throughout the film, and high and neutral morale were significantly less present. No large differences in absolute numbers are apparent until approximately the midpoint of the film, when low morale begins a rapid rise. The separation appears to begin at 39 minutes into the film.

Figure 4, for Actualization Group No. 3, shows the results of morale plotted by transformation in the upper portion of the figure, and plotted cumulatively in the lower portion of the figure. This film revealed predominantly negative morale with high morale beginning to increase its rate of appearance after the 20-minute point of the film. Neutral morale ratings showed a tendency for approximately the same rate of emission throughout the presentation. At the 17- or 18-minute mark, there was a noticeable decline in judges' ratings of low morale, which began to be reflected in other areas of the ratings at about the 20- or 22-minute mark where a marked increase in ratings of positive morale recurred. Again, there appeared to be clearcut, systematic changes in morale scores occurring throughout the film with a tendency away from randomized scores. For this figure, it can be seen that low morale predominated for the first half of the film, while high morale predominated for the latter portion of the film.

Figure 5 shows morale data, as the transform, plotted for Actualization Group Film No. 6. On an overall basis, this reveals a higher level of morale than for Actualization Group Film No. 3, shown in Figure 4. The lowest point in morale occurred at approximately 18 minutes into the film. The clearcut, systematic variation in the scores of the judges in rating

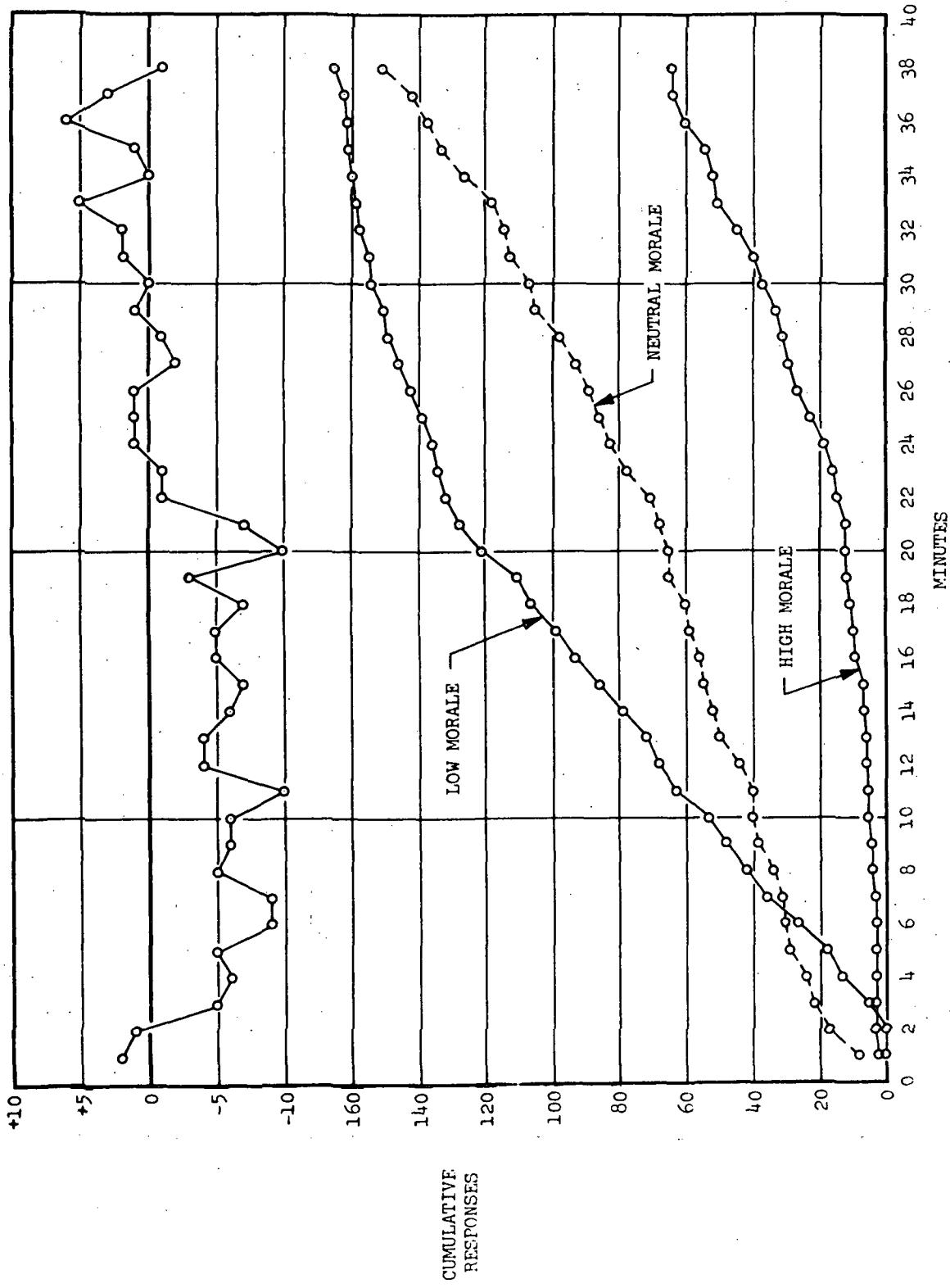


Figure 4. Morale — Actualization Group No. 3

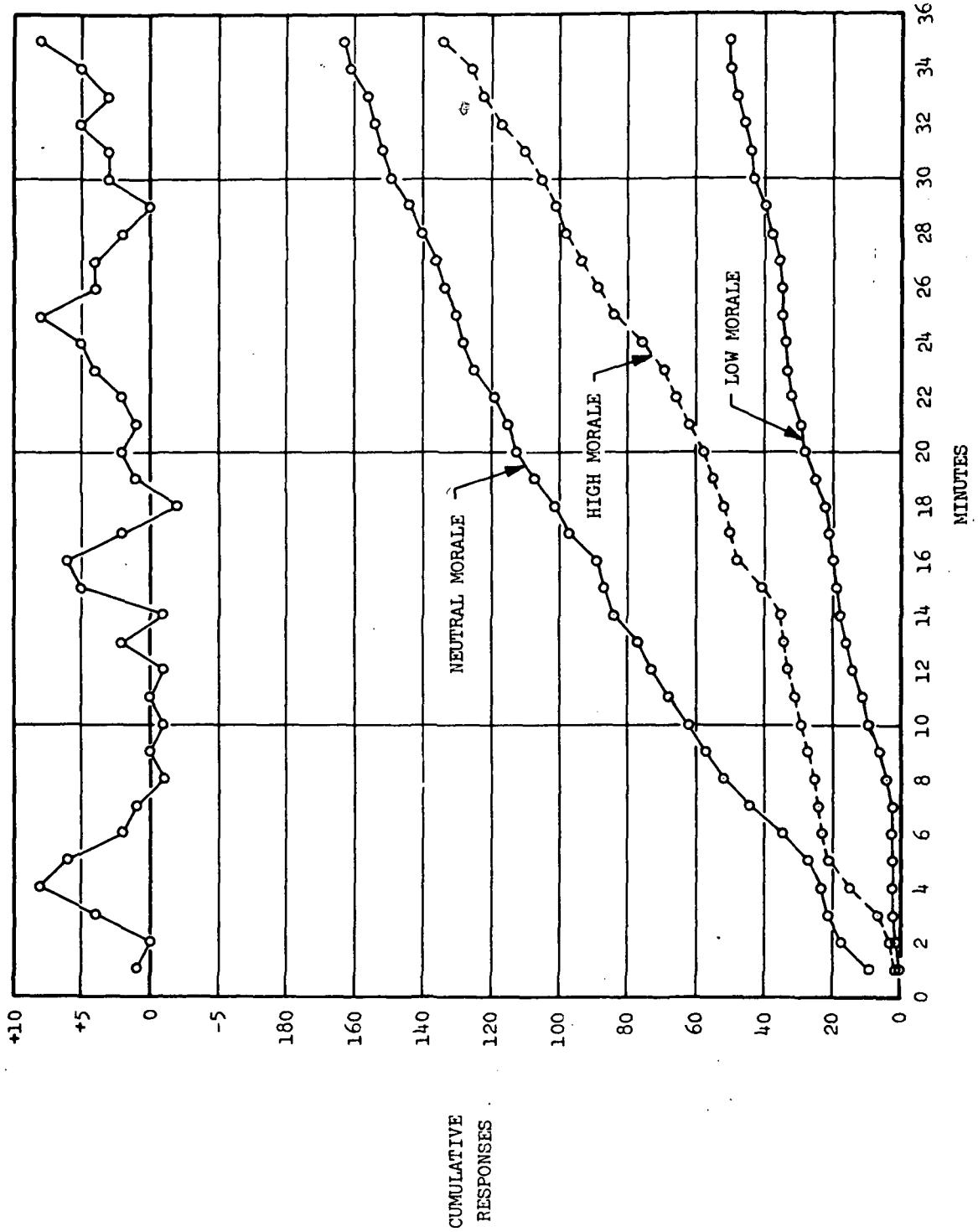


Figure 5. Morale — Actualization Group No. 6

morale provides some confidence that within films the morale rating system was measuring and tracking a variable of interest. The cumulative curves shown beneath the transformation graph reveal that there was a predominantly large amount of high morale present in this film as opposed to the previous film in this series.

#### 4.2 OBSERVER TRAINING

As indicated earlier, film or film segments were employed for all training sessions. The longest of these films was the Actualization Group Film No. 7 which is represented in Figures 6 and 7. Results shown on these two figures are representative of training results accomplished on all films. Figure 6 shows the data obtained from the first complete runthrough of Film No. 7 for the group of eight observers. This represented the second time the subjects had been shown any portion of Film No. 7. The curves are plotted on an absolute basis with no attempt at cumulative scoring or transformations. The data shown indicate the total number of responses for each minute from the group of observers.

Of interest in this graph is the overall pattern of neutrals, negatives, and positives as scored throughout the film. It will be seen that predominantly neutral responses were obtained at the 5-minute mark with another peak seen at the 27-minute mark. At almost all points in the film, neutral responses predominate until a reversal occurs at approximately Minute 18, when positives peak at approximately the 60 response level. Negatives appear to peak at the 22-minute point. In both these cases, there is a sharp drop in the number of neutrals scored, a result that would be expected in terms of the total number of scores obtained for those times.

Figure 7 shows the same group of observers after approximately four showings of the same material during the training sessions. The time base for this showing, which was the retest run immediately prior to the first experimental session, shows 34 data points. This is in contrast with 30 data points shown in Figure 6. The reason for the disparity is that stop times of the film were different, and more of Film No. 7 was shown during the retest than had previously been available for the earlier run. The correspondence between curves obtained on Run 2, shown in Figure 6, and retest run, shown in Figure 7, is considered good.

CR56

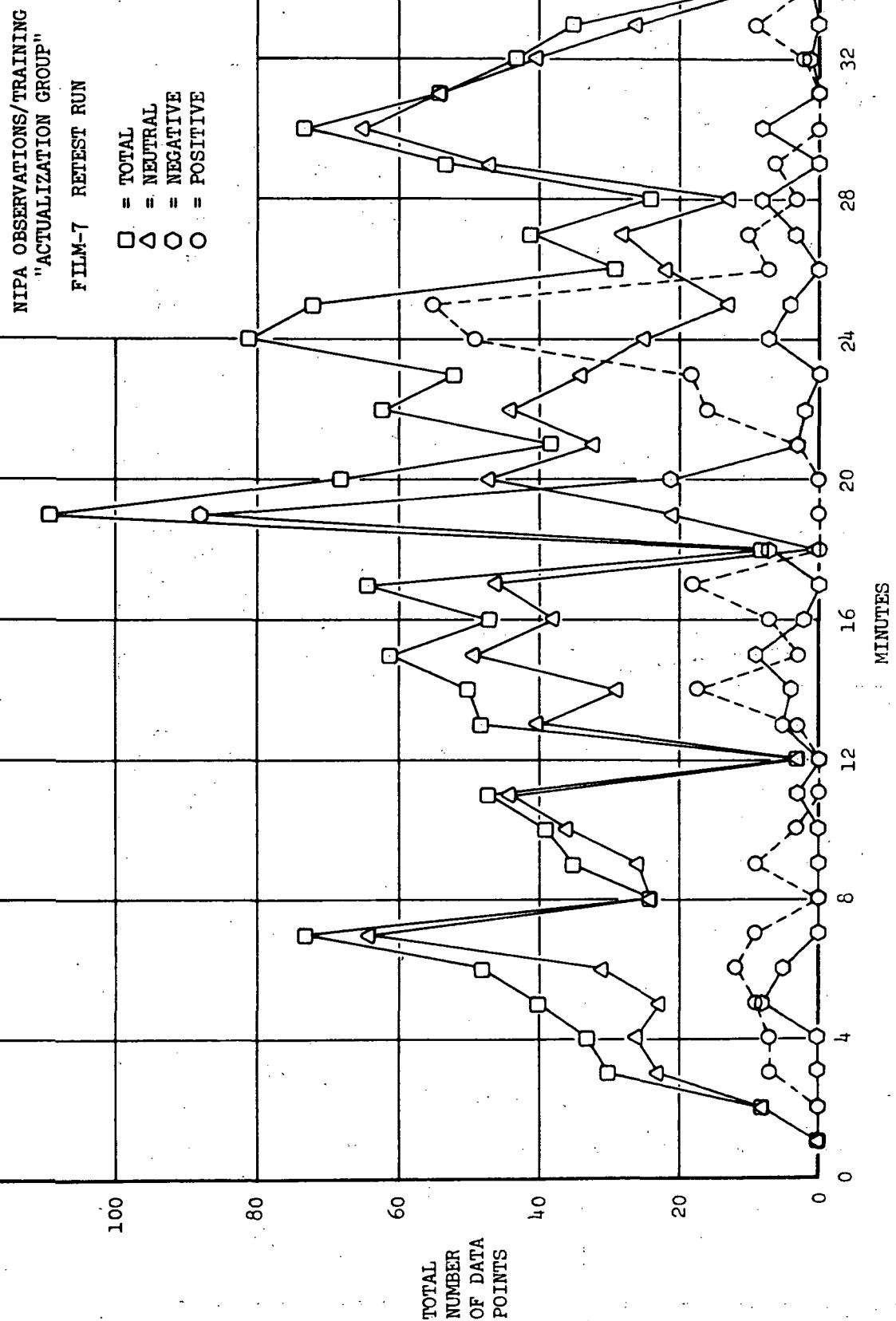


Figure 6. Observer Training — Run 2

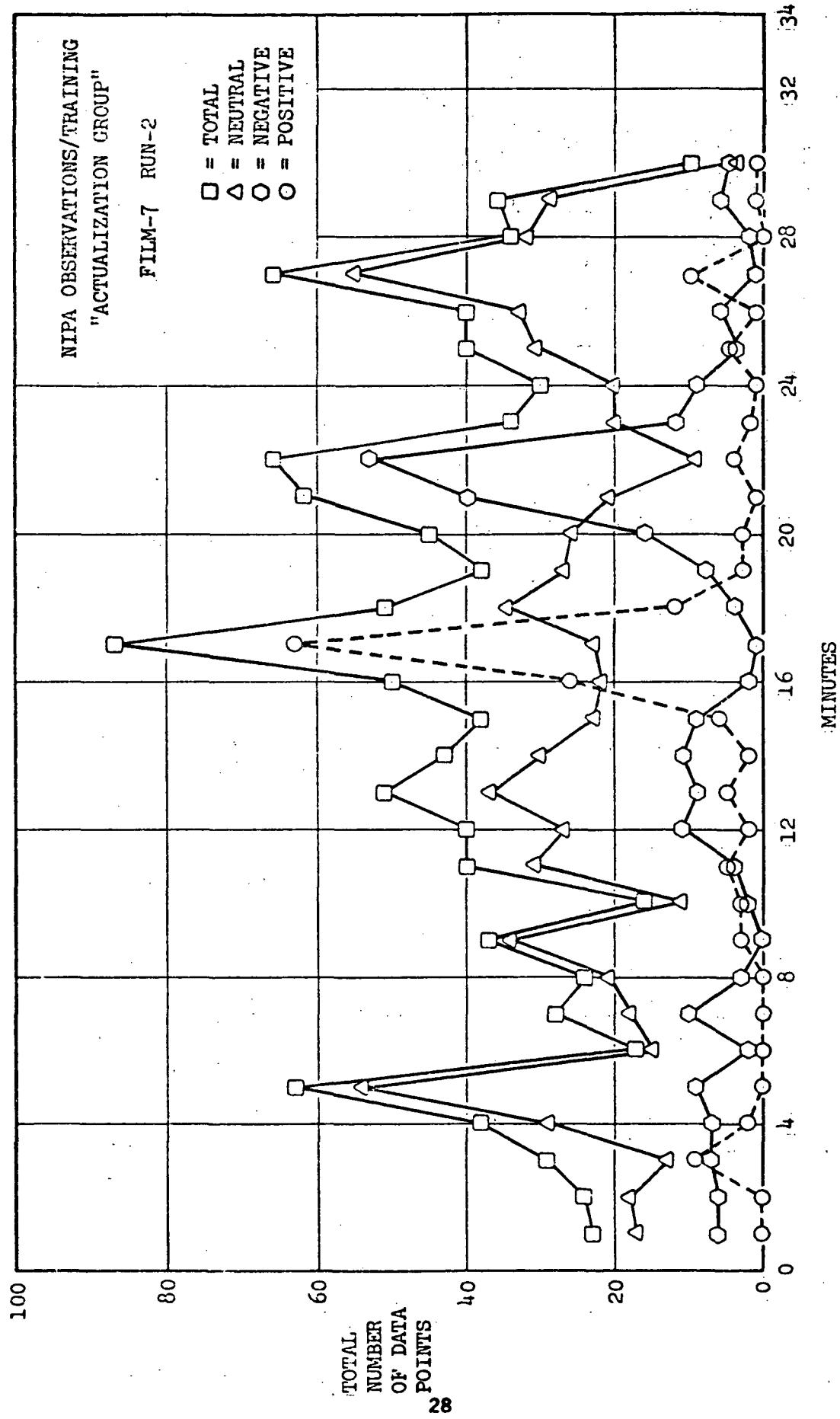


Figure 7. Observer Training - Retest

Peaks in neutrals in Figure 7 occur at the 7-minute mark and again at the 30-minute mark. Contrasting this with the 5-minute and the 27-minute marks in Figure 6 indicates some asynchrony in the showing time of the films. By examining total number of responses, we see that in Figure 6 the point of minimum total occurs at 10 minutes into the film, while in Figure 7 the same point occurs at 12 minutes into the film. This period is one in which very few responses could be obtained from the film because a narration occurred at that point. The lack of correspondence (asynchrony) is on the order of 1, perhaps 1-1/2 minutes. A peak in positives occurs at the 7-minute mark, and a prominent peak in negatives occurs at the 25-minute mark. This corresponds with the previous peaks for the same verbalization scores at 9 and 27 minutes in the previous graph.

It will be seen that there was a higher total number of response scores on the second graph than on the first. This was a tendency seen in all films and it continued throughout the training sessions. The tendency was for increased responses to be scored by the observers as time progressed. A slight tendency of this sort was also seen across the experimental sessions, but asymptotic levels were being approached at that point. True asymptote in total response scoring was not achieved in training. Non-significant differences existed across experimental sessions. Thus, except for minor synchronization between scores due to minor variation in experimental conditions during training, there appears to be correspondence between training sessions for the same film by all subjects. This, of course, ignores intersubject variability.

While a desirable degree of correspondence existed among all observers, as revealed by the graphical patterns shown on these two figures, absolute numbers increased as frequency of exposure to the film material increased. Inasmuch as patterns were deemed to be of more value to the study than absolute numbers of responses, the level of training was judged suitable to the needs of the study.

#### 4.3 EXPERIMENTAL SESSIONS

Results of the analysis of variance are shown in Table 1. The Freedman Nonparametric Two-Way Analysis of Variance by Ranks (Reference 5) was

Table 1  
ANALYSIS OF VARIANCE<sup>+</sup> SUMMARY

Variance Sources	NIPA Data	Differences Significant	Level of Significance	Conclusions
Audio Only	Positives AV-T & A-T	None	N.S.*	No differences in positive NIPA scores; audio equals audio-visual condition.
Session I NIPA Observers (All Films)	Positives AV-T & A-T	Observer: G < Group	< 0.01	Observer G consistently provided fewer NIPA positives than the group.
Session II NIPA Observers (All Films)	Positives AV-T & A-T	Observer: F < Group	< 0.05	Observer F consistently provided fewer NIPA positives than the group.
Session III NIPA Observers (All Films)	Positives AV-T & A-T	Observer: G < Group	< 0.01	Observer G consistently provided fewer NIPA positives than the group.
Session IV NIPA Observers (All Films)	Positives AV-T & A-T	Observer: F < Group	< 0.01	Observer F consistently provided fewer NIPA positives than the group.
Session I	Positives AV & A-M	F < H	< 0.05**	Observer F scored fewer positives than Observer H when observing an individual in a film.
Session II	Positives AV & A-M	None	N.S.	
Session III	Positives AV & A-M	None	N.S.	
Session IV	Positives AV & A-M	None	N.S.	

+Freedman Non-Parametric 2-Way Analysis of Variance by Ranks. AV = Audio-visual presentation

\*Non-significant at 0.05 level.

\*\*Sign Rank Test (Analysis of variance not performed: data insufficient)

A = Audio presentation

T = Observation of subject group

M = Observation of individual subjects

performed on positive NIPA responses in an effort to estimate the correspondence of NIPA observers across experimental sessions. In order to perform this analysis, all NIPA positive responses were grouped into 5-minute periods and ranked. In view of the finding that no differences between groups could be detected under the experimental conditions of audio-visual versus audio alone, both audio-visual and audio responses were combined. Table 1 shows that during Sessions I through IV two observers recorded significantly fewer verbalizations than all other observers. This is true for all films shown in each session.

Results of the Sign Tests (shown at the bottom of Table 1) for observational conditions in which observers were required to record the responses of individual group members of the films showed that one observer scored lower than other observers for the same material. Greater correspondence is seen among observers when observations are made of individual group members than of the total group. This is evidenced in the non-significance of differences for Sessions II, III, and IV shown at the bottom of Table 1.

An analysis of variance was not performed on observational conditions in which observers were required to record individual verbalizations because data necessary for the analysis to be performed was lacking. Graphical data supports the contention that there was greater correspondence on negatives under all conditions than on positives. Therefore, this table represents the situation in which least correspondence could be obtained.

Table 2 reflects the results of correlational analysis performed on all data in an effort to test the hypotheses of the experiment. This table reveals that for all films there is a significant correlation (0.389) between positive NIPA scores by all observers and high morale ratings by all judges. For negative NIPA and low morale scores, a higher correlation (0.524) results, which is also significant at less than the 0.001 level. Another correlation (shown to the right of this table) was performed which attempted to determine the relationship between the ratio of positive NIPA responses to positive and negative NIPA responses versus the ratio of high morale to high morale plus low morale ratings. As would be expected, this correlation is also significant at less than the 0.001 level.

Table 2  
CORRELATION<sup>+</sup> SUMMARY

Film Segment	Degrees of Freedom	Statistic	Correlation <i>t</i>	Negative NIPA and High Morale	Positive NIPA and Low Morale	Positive NIPA Ratio and High Morale Ratio
Actualization Group Film Number 3	36	Significance N.S.*	0.287 1.774 N.S.*	0.854 9.695 <0.001	0.586 4.278 <0.001	
Actualization Group Film Number 1	34	Significance	0.434 2.769 <0.01	0.445 2.852 <0.01	0.522 3.520 <0.001	
Ten Who Dared Reel Number 1	22	Significance	0.257 1.218 N.S.	-0.378 1.869 N.S.	-0.105 0.484 N.S.	
Ten Who Dared Reel Number 2	26	Significance	0.486 2.783 <0.01	0.103 0.522 N.S.	0.549 3.287 <0.01	
All Films	122	Significance	0.389 4.625 <0.001	0.524 6.748 <0.001	0.448 5.488 <0.001	

+Product-Moment Correlation  
\*Non-Significant at 0.05 level.

Some inconsistencies in this table are seen in the negative but non-significant correlation between negative NIPA responses and low morale for "Ten Who Dared", Reel 1. This is contrary to the predictions. It is clear, however, that across all films for both positive and negative NIPA responses, obtained correlations, excluding the exception noted above, were in the predicted direction. Product moment correlation coefficients for all films, for all observers, and for conditions in which observers were required to record total group verbalizations, support the hypotheses presented. These correlations, moreover, are considered low correlations due primarily to the large standard deviations of the criterion and NIPA measures. Analysis of the mean and standard deviation of the criterion morale scores reveals a mean rating across all films by all judges in all categories of 2.5, with a standard deviation of 2.19. The same analysis for all NIPA data reveals a mean score of 7.29 and a standard deviation of 8.67. The significant correlations obtained, despite such large error in the measures, indicates the possible existence of a stronger correlation than was revealed by the study and suggests that the major factor tending to reduce the overall size of the correlations was the high error—primarily in the NIPA measures.

Further analyses were not done to identify, from among the NIPA observers, that subgroup which scored similarly and had least error. A visual examination of the tabulated data suggests, however, that five of the eight observers were scoring in the same area, while three tended to deviate either higher or lower than the other five observers. This is supported in part by the analysis of variance results reported in Table 1.

Two conclusions can be drawn from this observation, (1) fewer than eight (approximately five) observers would be required to replicate the results, and (2) if a single observer were used who had been trained so that his scores would correlate with those of the group of five mentioned before, data derived from that observer would be sufficiently accurate and sensitive to track morale.

Section 5  
TECHNIQUES FOR DISPLAY OF NIPA DATA

From an operational standpoint, the NIPA technique for measuring morale has the great advantage that data can be collected in real time, requires little manipulation, and should thus be available for display for mission monitors in near-real time. As a part of the present study, the needs of potential operational users of NIPA-type data were analyzed, and various techniques for processing and presenting data to meet those needs were compared.

5.1 USER NEEDS

Review of previous manned tests and discussions with personnel charged with management of such tests indicate that the potential operational user of morale measurement data needs information on level of morale and trend indications. Where a morale problem seems to be developing, he needs diagnostic information to decide on the proper course of remedial action. Thus, he seeks answers to the following questions:

1. What is the level of morale of the crew?

Users need quantitative information on the level of morale relative to some standard—whether it is normal, abnormally high, or abnormally low. Thus, in the display of morale data, they need something akin to the red line on an oil gage to warn them how close morale is to the hazardous level. They also need temporal data, which gives them past history on the level of morale plus predicted levels if possible.

2. What is the level of morale of individual crewmen?

This information, in much the same form as overall crew data, is diagnostic in nature and can assist the user in pinpointing particular individuals who may be contributing to the general deterioration of morale.

3. How are the crew and individual crew members doing on other measurable parameters (adherence to schedule, selected task times, transmission errors)?
4. Are there any abnormalities in available biomedical parameters?  
Again, this information regarding such parameters as heart and respiration rate, blood pressure, and sleep activity (EEG) is diagnostic in nature and would be beneficial to users in pinpointing causes for change in morale.
5. What is the magnitude of communication interaction among the crew and between the crew and ground control, and what is the history of this parameter?

During the 90-day confinement, test conductors felt that deteriorating morale was preceded by and accompanied by decreased communications both among the crew and between the crew and outside monitors.

Potential users feel that the NIPA data identified in Question No. 1 should be available in as near real time as possible and should be displayed prominently and continuously. The other data could be stored but should be available for immediate callup at the same display console as the primary morale data.

## 5.2 DISPLAY TECHNIQUES

Daily NIPA observe absolute totals could be summarized and displayed as cumulative graphs. Each day's cumulative record would thus be available for comparison with trends evident from previous days. From experience gained in the 90-Day Test, it appears likely that trends of less than 3 days' duration are less reliable than trends which persist beyond 3 days. It might also be desirable to provide independent cumulative records of positive, negative, and neutral verbalization NIPA data to provide a complete picture of the quality of crew interactions for cognizant operational personnel.

Another method of presentation of NIPA data would be by means of comparative presentation of daily and previous cumulative slope angles. This would require software to be used to calculate slopes of cumulative records previously

obtained. A minor drawback of this technique lies in the relative inability to obtain "powerful" slope data for the early part of a mission. This drawback is considered of minor consequence inasmuch as morale is not expected to be significantly affected in the early stages of a long-duration mission. Availability of such a display would provide operational personnel with rapid, quantitative, comparative data on rate of emission of positive, negative, or neutral verbalizations during a mission and a rapid means of comparison of the emission rates of each of these types of verbalizations with previously established emission rates. Another possible method of presentation is one that derives from a common medical graphical technique which simply describes the trend data as either being maintained (horizontal arrow), increasing (vertical arrow pointing upwards), or decreasing (vertical arrow pointing downward). While providing little quantitative or absolute data, such a method of presentation offers a rapid, qualitative evaluation of the trends in the ongoing data. Thus, for example, if the user notes that the emission rate of negative, neutral, and positive verbalizations is being maintained at a par level with no tendency for increase or decrease, he can opt to omit further review of absolute quantitative NIPA data. Should he, on the other hand, note a qualitative change in trend toward an increase or a decrease, he would be free to examine (call up) quantitative data on each of the three NIPA variables for further, more detailed analysis. Software, of course, would be required to provide the means of summarizing observations as trend indicators.

### 5.3 METHODOLOGICAL CONSIDERATIONS

It is recommended that NIPA data be maintained confidential, inasmuch as feedback to the crew of the results of NIPA analyses may tend to affect behavior. Such an effect can be either positive or negative depending upon the method of presentation to the crew and the viewpoint of the observer. Mission operational personnel should only become aware of the nature of NIPA analyses when the situation warrants. The decision to release NIPA data to either the crew or others should be a medical and mission-control management decision.

Crew members should be totally and thoroughly familiarized with the objectives of the NIPA data collection technique and analysis and be informed as to the backgrounds and qualifications of those who will be doing the observing.

While such an approach fulfills the moral and ethical considerations involved in observing and measuring human behavior, it may tend to affect performance and behavior of crew members during long-duration missions. The "big brother" effect may ultimately prove to be undesirable but is preferable to surreptitious observation.

## Section 6 CONCLUSIONS

Despite the high error recorded in all measures (criterion and NIPA variable), significant but low correlations were obtained which support the experimental hypotheses. All but one of the three major hypotheses of this study were supported by the data. The exception was Hypothesis 4, which dealt with total group versus individual group member observations by NIPA observers. The latter hypothesis was neither supported nor denied due to insufficient data for statistical analysis.

The study generally supports the contention that observers of verbal interaction who are required to categorize and score the affect content of verbalizations of onboard crew members during an operational situation can in fact provide quantitative, remotely obtained, ongoing data on the morale level of small groups using audio data only. Evidence from this study also suggests that as few as one well-trained observer may be required to accomplish such quantitative observations. Use of this measure throughout an operational mission could avoid the tendency toward increasing bias by "involved" operational staff members who are normally required to continue to provide information on the morale levels of crew members aboard long-duration space-flight missions. It is clear, moreover, that it is unnecessary to make such observations on individual group members of such a crew. Rather, it appears advisable to utilize a single observer to make observations of total interactions of the crew as a whole and not restrict observation to one group member. In view of the fact that NIPA observers were provided with less information as to film content during all the films than were judges, yet correlations were nevertheless in the proper direction in most cases and of sufficient size to result in high statistical significance, it appears that NIPA may be a more efficient measure of group morale than judges. While conclusive evidence for this finding would derive from a study in which the amount of information

contained in both presentations was quantitatively contrasted and the economic aspects of presentation of such information were evaluated, evidence currently available suggests that efficiency can be achieved more readily by using the NIPA technique than by requiring CAPCOM observations.

There was no evidence during this study that sex of observer affected the nature of the NIPA observations. Nor was there evidence that sex of the judges affected morale ratings. In view of the lack of evidence to the contrary, it is suggested that selection of future operational observers not be restricted to male or female populations, but be freely drawn from either. The main criterion for selection of such observers is lack of involvement with operational aspects of the mission and sensitivity to emotional content of verbalizations.

No information is available from this study on the persistence of a particular bias on the part of the observer. Although some observers during this study were consistently low or consistently high on their scoring of affect content across all films and across sessions, there is no information on how long such a bias would persist or if it would persist beyond the one-week period investigated in this study. This suggests that studies be done of calibration level and persistence of observers prior to their utilization during an operational mission.

An interesting side result of this study (noticeable in Figure 3) is a method of analyzing for emotional content a film such as "Ten Who Dared". Discussions with the supplier of the film indicated that this was the first time such a presentation of the film had been made. Its presentation evoked some surprise and interest in its potential as a method of predicting the impact of films in their entirety or of scenes contained within a film prior to their release to the public.

It would be desirable to examine the potential of this technique for predicting success of a motion picture for entertainment purposes from the viewpoint of emotional impact upon one or a small group of trained observers. Another advantage of this technique for the film industry would be its potential

utilization as a means of evaluating, in advance of film release but during the production process, the impact of suggested changes by directors, actors, or writers as the film is being made. Further anticipating the high cost of production, it may be possible to perform similar analyses on script material in advance of filming.

The study described herein concludes that NIPA is in fact a valid means to measure group morale and that either negative or positive NIPA responses correlate well with group morale of filmed material. The extent to which NIPA is applicable to real-life situations, especially those within the manned space area, is still unclear. It would perhaps have been desirable to obtain films of actual unrehearsed group interactions on long-duration missions and perform a similar study using them as subject material. Nevertheless, the tendency of the material used in this study toward greater reality among the Actualization Group films versus "Ten Who Dared", and the nature of the correlations obtained indicate that indeed, as subject material approaches reality, correlations tend to be more valid than if material is used that has been subject to the artistic interventions of the motion picture industry. Such material is less useful for experimental purposes.

A major difference between the film "Ten Who Dared" and reality of a long-duration mission (as seen from results of the 90-Day Test) is that negative verbalizations among a confined group tend to be suppressed. "Ten Who Dared", on the other hand, tended to emphasize negative verbalizations as a device to stimulate audience interest and to portray a sense of accomplishment in overcoming obstacles.

Section 7  
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Appendix A  
MORALE RATINGS

NAME:						MORALE DEFINITION: 1 2 3 4 5 6 OTHER		
DATE:						FILM TITLE:		
MORALE		INFO	MORALE		INFO	MORALE		INFO
L	H		L	H		L	H	
1	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
2	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
3	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
4	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
5	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
6	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
7	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
8	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
9	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
10	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
11	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
12	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
13	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
14	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
15	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
16	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
17	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
18	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
19	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
20	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
21	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
22	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
23	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
24	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
25	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
26	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
27	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
28	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
29	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI
30	1 2 3 4 5	SMI		1 2 3 4 5	SMI		1 2 3 4 5	SMI

Appendix B  
DEFINITION OF MORALE

MORALE IS A CHARACTERISTIC OF GROUPS THAT REFLECTS THE EXTENT TO WHICH MEMBERS (1) ACCEPT AND HAVE CONFIDENCE IN THE GOALS OR PURPOSES OF THE GROUP, (2) ARE ACTIVE AND COOPERATIVE IN STRIVING TO ACCOMPLISH THOSE GOALS AND PURPOSES, (3) ARE SATISFIED WITH GROUP LEADERS AND OTHER GROUP MEMBERS, AND (4) EXPRESS HOSTILITY AGAINST OUTSIDE FORCES RATHER THAN AGAINST GROUP MEMBERS.

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**Appendix C**  
**INSTRUCTIONS TO JUDGES**

You are about to be shown some films, portions of which will be used later by NIPA observers. The NIPA study entails an examination of the relationship between your evaluations of these films and measurements of another sort to be made later by trained NIPA observers.

The purpose for which you have been asked to attend these showings is to provide criterion information on the level of morale which is portrayed throughout the films. To this end, you have been provided with two forms.

Form I is a definition of morale. Please review this definition now to be sure of your complete understanding of what we consider morale to be. From this point on, you will be using this definition to provide evaluations of the film material. If there are any questions about this definition, please ask them now.

Form II is a data sheet to be used during the film viewing. Throughout the film, at one-minute intervals, a small tone will be sounded. Coinciding with the tone, you are to encircle your evaluation of morale level as high (Number 5) if the behavior at that point in time conforms with the definition of good morale, low (Number 1) if there have been indications of poor morale, and neutral (Number 3) if morale appears neither positive nor negative. Where it seems appropriate, use the intermediate numbers 2 and 4. Do not leave any spaces blank. If you are not certain of the level of morale you have seen, make your best guess and enter it in the appropriate space.

Next to each morale rating, encircle "S" if the information contained in the film during the previous minute was sufficient to your needs in evaluating

morale; encircle "M" if it was moderately sufficient; and encircle "I" if it was insufficient.

\* \* \*

If there are no question, we will begin.

## Appendix D

### INSTRUCTIONS - EXPERIMENTAL SESSIONS

Your training has progressed to the point that it now appears feasible to conduct experimental data collection. You will shortly be exposed to audio-visual material which depicts characters with whom you are familiar. Interactions, however, are different than you have been exposed to. Your task remains identical to what you have been taught during earlier sessions. You are to identify a verbalization and classify it as either positive affect, neutral affect, or negative affect.

To refresh your memory as to the sounds of the voices of the filmed characters, I will now have a short segment of training film shown. During this showing, make whatever notes you require to assure yourselves that you can quickly identify the characters by the codes on your data sheets.

### REPLAY OF TRAINING FILM

Now that you have refreshed your memories as to the characters and their voices, are there any questions? (If questions reveal a need for replay of training film, perform.)

Data collection is about to begin. Remember: A positive verbalization is one which you would tend to receive as emotionally supportive, a negative verbalization is one which would tend to be received as nonsupportive or emotionally destructive, and a neutral verbalization is one which would tend to be received without evoking affect.

[Announce experimental observational conditions (Figure 2)]

If for some reason you are unable to quickly record some aspect of the data, do not dwell on it. Omit the data you must, but try to stay current with the interactions on data collection. A best guess as to affect content or interacting

parties is better for the study than no record at all, or a considered opinion. I remind you to pay attention to the tones at one-minute intervals and be certain to note their occurrence with a checkmark.

Appendix E-1

OBSERVER: DATE:			<input type="checkbox"/> SOUND		<input type="checkbox"/> INDIVID		START TIME:				
CONDITION:			<input type="checkbox"/> SOUND & VISUAL		<input type="checkbox"/> GROUP		STOP TIME:				
AFFECT	ORIG	RECVR	SCORE	AFFECT	ORIG	RECVR	SCORE	AFFECT	ORIG	RECVR	SCORE
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
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35											

Appendix E-2

Experimental Session Protocol

Films were shown in the following sequence during the experimental sessions conducted between October 10, 1972 to October 13, 1972:

Session 1

- a. "Ten Who Dared" Reel 1
- b. Actualization Group Film No. 3
- c. "Ten Who Dared" Reel 2
- d. Actualization Group Film No. 6

Session 2

- a. Actualization Group Film No. 3
- b. "Ten Who Dared" Reed 2
- c. Actualization Group Film No. 6
- d. "Ten Who Dared" Reel 1

Session 3

- a. "Ten Who Dared" Reel 2
- b. Actualization Group Film No. 6
- c. "Ten Who Dared" Reel 1
- d. Actualization Group Film No. 3

Session 4

- a. Actualization Group Film No. 6
- b. "Ten Who Dared" Reel 1
- c. Actualization Group Film No. 3
- d. "Ten Who Dared" Reel 2

Appendix F  
NIPA OBSERVER DEFINITIONS

Observer: KL

Date: 9-29-72

Positive Response: Showing of emotion that is supportive, warm, affectionate,  
EX: Your leadership ability has really made this a learning experience.

Negative Response: A response that is destructive to the group. A response that is hostile, given with anger, sarcastic, or obviously nonsupportive.

EX: That man is leading us into our destruction.

Neutral Response: One that lacks definite positive or negative affect. Most statements that are questions are negative. Those statements as to which I am not certain whether or not positive or negative.

EX: How far is it to the nearest city?

Date: 10-13-72

Positive Response: A positive response is one that has a supportive, emotional kind of connotation. One that I would interpret as being warm, supportive or with good feeling.  
EX: I now feel like a united, whole person and it's great.

Negative Response: A negative response is one that I would term as non-supportive and would generally give me bad feelings. Such emotions as anger, hostility and resentment are usually conveyed.

Neutral Response: A neutral response is one in which not much emotion is conveyed one way or the other. It is a response that I cannot decide on whether it is positive or negative. Usually a bland statement or question.

Observer: PM

Date: 9-29-72

Positive Response: A verbalization that shows affection for or approval of one or more members of the group.

EX: Thank you; you look nice today; you are right, we've made it.

Negative Response: A verbalization that shows disapproval of a member of the group or his actions.

EX: Shut up. You're mad.

Neutral Response: A verbalization that is neither positive nor negative.

EX: Questions, statements of fact.

The river is rough.

My name is George.

Why did you come?

Date: 10-13-72

Positive Response: A statement of approval toward the actions of another member or members of the group or a statement that the speaker is happy or in a good mood. Or a statement showing affection.

EX: You're nice.

Thank you for doing that.

Have good food, a good fire, etc.

You mean so much to me.

Negative Response: A statement of disapproval of another person or of another's action.

EX: He's crazier than a loon.

I'll flatten him.

Neutral Response: Anything not positive or negative. Most questions.

EX: How much flour is left:

My name is Missouri.

Observer: SG

Date: 9-29-72

Positive Response: Remarks which actively show approval, support or affection to another person, or remarks which are proffered in a manner to elicit such responses from others or remarks which show such approval or satisfaction with the group as a whole or spontaneous expressions of joy or expansiveness.

Negative Response: Remarks which exhibit dissatisfaction, annoyance, or anger for something that is said, done or a general situation. It includes remarks meant to discredit another or destroy an idea which is taking shape.

Neutral Response: Remarks of an impersonal nature; often task-related. Giving or asking for orientation or information. Includes emotive responses which are ambiguous or do not contain feedback relevant to the others.

Date: 10-13-72

Positive Response: Responses which are supportive of other persons, or show enjoyment, or verbalizations which attempt to rally such responses in others.

Neutral Response: Statements devoid of emotionality, giving information, asking questions; also emotional statements difficult to classify as negative or positive such as expressions of fear or pleading.

Negative Response: Expressions of disapproval, hostility. Remarks which are overtly destructive of others.

Observer: AC

Date: 9-29-72

Positive Response: Verbal reflection of "good feelings" about an event, towards another, or about himself; encouraging or supportive remarks to another indicating approval.

EX: I appreciate your help.

You can do it.

You did a good job.

We made it!

Negative Response: Verbal reflection of hostility, annoyance, anger or disapproval toward self, another, or about a situation, either said directly or inferred by tone of voice.

EX: Shut up, you dumb ass!

Is that the best you could do?

Neutral Response: A remark made with no reflection of hostility, etc., or encouragement, etc., although it may range from highly emotional or neutral.

EX: We will not add up the scores.

There was quite a disparity between this run and the last.

This may also be positive or negative depending on the tone of voice.

Date: 10-13-72

Positive Response: Any response which evokes pleasure in one'self or others—e.g., I feel good.

Neutral Response: A statement of fact or opinion or belief which neither produces nor reflects positive or negative. e.g., "I have to go".

Negative Response: Any response which reflects displeasure or aimed at producing displeasure in another or others. e.g., "What a drag these films are!"

Observer: BLS

Date: 9-29-72

Positive Response: A supportive verbalization (for our study) that reinforces another individual's self-esteem—such as, I appreciate you. Words like "like", etc. that carry feeling with it.

Negative Response: A statement that intended to be destructive or belittling. Statements like "you're crazy" and said with emotion are negative.

Neutral Response: Verbalizations that are informative and clarifying. They carry no feeling or emotional content.

Date: 10-13-72

Positive Response: Any statement that is supportive to another person's self-concept. The statement makes him feel good about himself. Such comments as I appreciate you, I like you, you did well then, etc., are positive verbalizations.

Negative Response: Any statement that is derogatory to another—a verbal communication that is destructive or demoralizing to another. Comments such as you are no good, you are lazy, etc.

Neutral Response: Factual comments. Verbal observations that are merely informative such as—the weather is fine.

Observer: TI

Date: 9-29-72

Positive Response: Optimistic, affirmative, desirable, good-humored, warm.

EX: Thanks, you saved my life!

Negative Response: Pessimistic, undesirable, disagreeable, cold.

EX: You have diarrhea of the mouth.

Neutral Response: Informational, bland, talking-to-be-talking, attention seeking—not directed to emotion, lukewarm.

EX: I have brown eyes.

Date: 10-13-72

Positive Response: Affirmative, agreeable, intended to boost morale of others, open, warm, said out of good spirits:

EX: I missed you.

Biscuits is ready.

Negative Response: Said out of hate, hostility—cold, guarded:

EX: Screw you!

I could kick you!

I don't like right now!

Neutral Response: No affect, talking to be talking, of little emotional tone.

Observer: MW

Date: 9-29-72

Positive Response: A positive verbalization is one which is meant not to hurt, bother or upset others. It is usually, but not always, well received.

EX: Frank Gordon's poetry—he meant well, but not well received! Person risks more in being warm to others.

Negative Response: A negative verbalization is one where little or no risk is involved. Meant to degrade or hurt another person or group. Meant to hurt another's feelings or to cut the other off. No wish to discuss topic.

Neutral Response: A neutral statement is usually used in banter or conversation. It is merely the issuing of information—not good or bad. Facial expression and voice intonation make a great deal of difference.

Date: 10-13-72

Positive Response: A positive response is given and usually received well. It makes the originator, receiver, and observer feel good.

Negative Response: A negative response is given and usually received coolly. Usually I feel negative are more honest than positive.

Neutral Response: Neutral responses are usually the passing of information or used in a simple conversation.

Observer: MJW

Date: 10-29-72

Positive Response: A response that encourages, praises, supports.

EX: "Why don't you sing, you have such a good voice."

Negative Response: Response that is hostile, destructive, degrading, blaming, angry.

EX: "You bitch!"

Neutral Response: Usually information giving or asking but can also be statements containing affect but that can't be considered positive or negative (such as fear).

EX: "I'm shooting the stars."

Date: 10-13-72

Positive Response: Verbalization that gives encouragement, praise, support, agreement.

EX: Major Powell asking the Englishman to stay with the group.

Negative Response: Statement that is taken hostilely—criticizing or condemning, hurting.

EX: Walter's reference to the Major's being a cripple.

Neutral Response: A factual statement with no strong feelings either way. Stating a fact. Giving information, asking for information. Also, may show strong affect that can't be classified as either positive or negative (such as fear).

EX: Major Powell's lecture on Trilobites is neutral.

APPENDIX G  
 MORALE SCORES  
 Film: Ten Who Dared  
 (N=8)  
 Number of Judges Scoring

Elapsed Time (Minutes)	Rating			Elapsed Time (Minutes)	Rating		
	5 & 4	3	2 & 1		5 & 4	3	2 & 1
1	3	5	0	44	0	0	8
2	4	4	0	45	0	0	8
3	4	3	1	46	3	2	3
4	4	3	1	47	4	1	3
5	3	3	2	48	6	2	0
6	3	2	3	49	6	1	1
7	0	5	3	50	3	1	4
8	3	3	2	51	0	1	7
9	5	1	2	52	1	2	5
10	7	0	1	53	1	5	2
11	4	2	2	54	3	3	2
12	0	2	6	55	1	3	4
13	0	0	8	56	0	5	3
14	1	1	6	57	1	1	6
15	1	2	5	58	2	1	5
16	7	0	1	59	1	3	4
17	5	3	0	60	1	2	5
18	0	2	6	61	2	2	4
19	3	4	1	62	1	2	5
20	1	1	6	63	2	1	5
21	0	1	7	64	1	2	5
22	0	3	5	65	1	5	2
23	0	2	6	66	3	4	1
24	3	2	3	67	5	2	1
25	3	5	0	68	4	3	1
26	4	3	1	69	End of Reel 2	2	1
27	4	4	0	70	Reel 2	3	0
28	3	4	1	71		0	8
29	3	1	4	72		0	6
30	2	1	5	73		0	8
31	6	2	0	74		0	6
32	6	2	0	75		0	8
33	2	4	2	76		0	6
34	End of Reel 1	2	3	77		1	5
35	Reel 1	1	4	78		1	5
36	5	2	1	79		1	6
37	2	4	2	80		2	5
38	2	2	4	81		2	5
39	1	0	7	82		2	3
40	2	1	5	83		3	1
41	0	2	6	84		4	1
42	0	2	6	85		6	1
43	0	1	7	86		5	1

MORALE SCORES  
 Film: Actualization Group No. 3  
 (N=10)  
 Number of Judges Scoring

Elapsed Time Minutes	Rating		
	5 & 4	3	2 & 1
1	2	8	0
2	1	9	0
3	0	5	5
4	0	2	8
5	0	5	5
6	0	1	7
7	0	1	9
8	1	3	6
9	0	4	6
10	1	2	7
11	0	0	10
12	1	4	5
13	0	6	4
14	1	2	7
15	0	3	7
16	2	1	7
17	1	3	6
18	1	1	8
19	1	5	4
20	0	0	10
21	0	3	7
22	3	3	4
23	1	7	2
24	3	5	2
25	4	3	3
26	4	3	3
27	2	4	4
28	2	5	3
29	2	7	1
30	4	2	4
31	3	6	1
32	5	2	3
33	6	3	1
34	1	8	1
35	2	7	1
36	6	4	0
37	4	5	1
38	0	9	1

## MORALE SCORES

Film: Actualization Group No. 6

(N=10)

Number of Judges Scoring

Elapsed Time Minutes	Rating		
	5 & 4	3	2 & 1
1	1	9	0
2	1	8	1
3	5	4	1
4	8	2	0
5	6	4	0
6	2	8	0
7	1	9	0
8	1	7	2
9	2	6	2
10	2	5	3
11	2	6	2
12	2	5	3
13	4	4	2
14	1	7	2
15	6	3	1
16	7	2	1
17	2	8	0
18	2	4	4
19	3	4	3
20	3	6	1
21	4	3	3
22	4	4	2
23	4	6	0
24	6	3	1
25	8	2	0
26	5	4	1
27	6	2	2
28	4	4	2
29	3	4	3
30	4	5	1
31	5	3	2
32	7	1	2
33	5	3	2
34	5	5	0
35	8	2	0